AIRS RT model comparison

R. Saunders
with inputs from
V. Sherlock, N. Borman, S. Hannon,
J-L. Moncet, Y. Han

- Rationale
- Models participating
- Initial results

Rationale

Activity

- ompare AIRS RT models
- ompute BTs for all 2378 annels for 52 profiles
- ompute jacobians for a lection of ~100 channels
- ocument run times

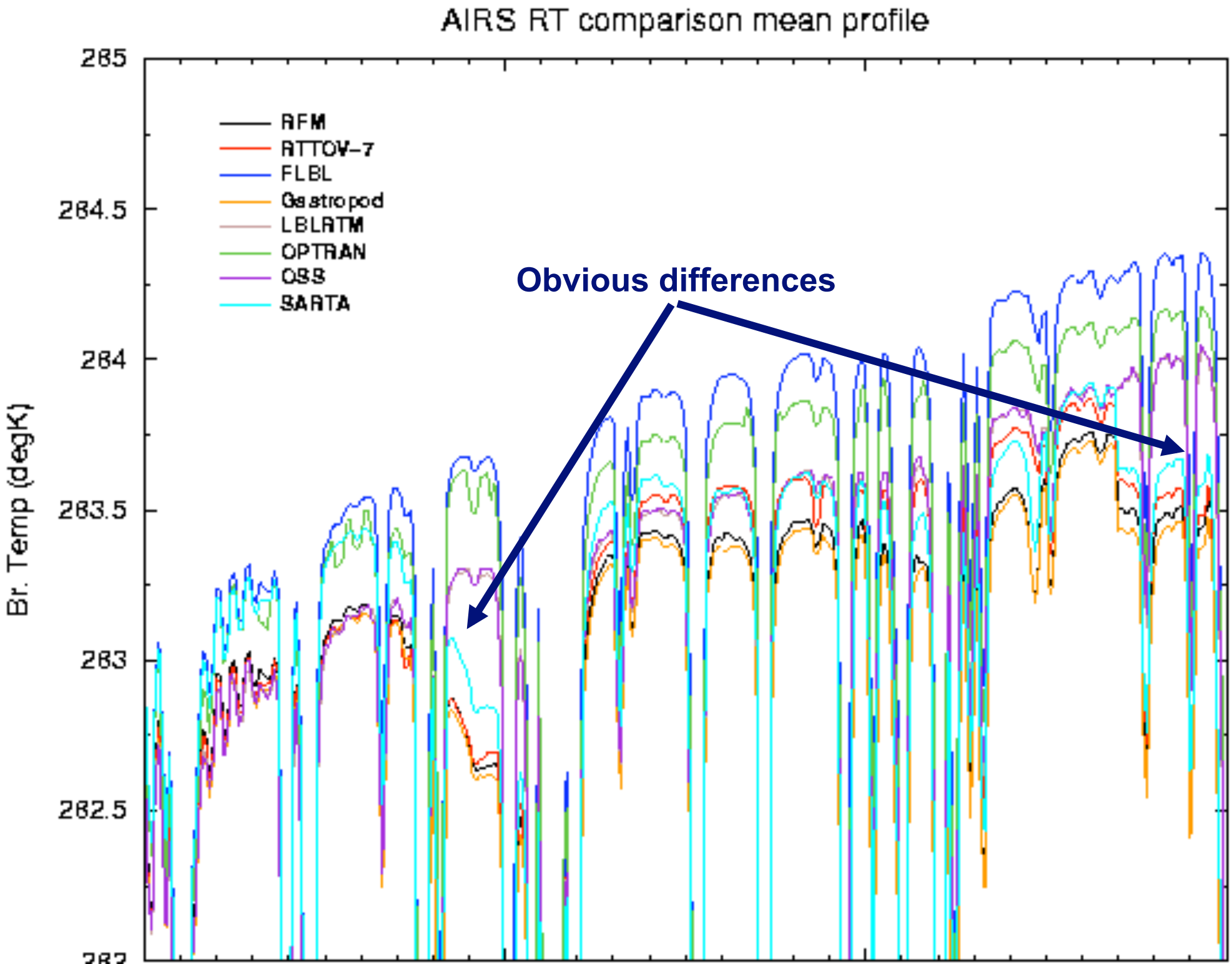
Outcome

- To assess accuracy of forward models
- To assess accuracy of jacobians for radiance assimilation/retrievals
- Assess utility for real time applications

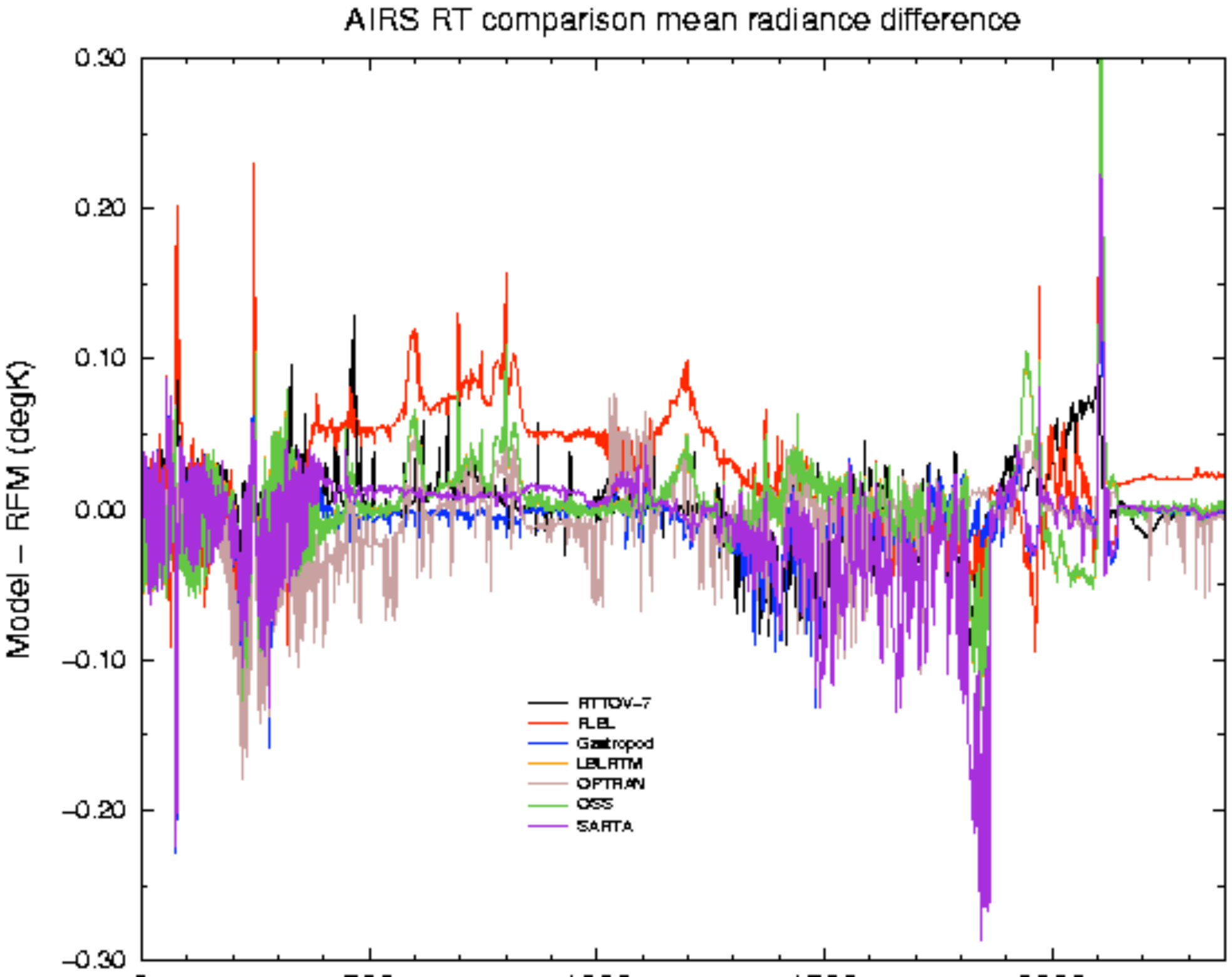
Model	Participant	Direct	Jacobian
RTTOV-7	R. Saunders, METO	Yes	Yes
Optran	Y. Han, NESDIS	Yes	Yes
OSS	J-L. Moncet, AER	Yes	No
LBLRTM	J-L. Moncet, AER	Yes	No
RFM	N. Borman, ECMWF	Yes	Yes
Gastropod	V. Sherlock, NIWA	Yes	Yes
ARTS	A. VEngeln, Bremen	Few chans	No
SARTA	S. Hannon, UMBC	Yes	No
NAST-I	W. Smith, NASA		
4A	S. Heilliette, LMD		
FLBL	S. Turner, MSC	Yes	
MSCFAST	L. Garand, MSC		
σ-IASI	C. Serio, Uni Bas		
Hartcode	F. Miskolczi, NASA		

Initial results

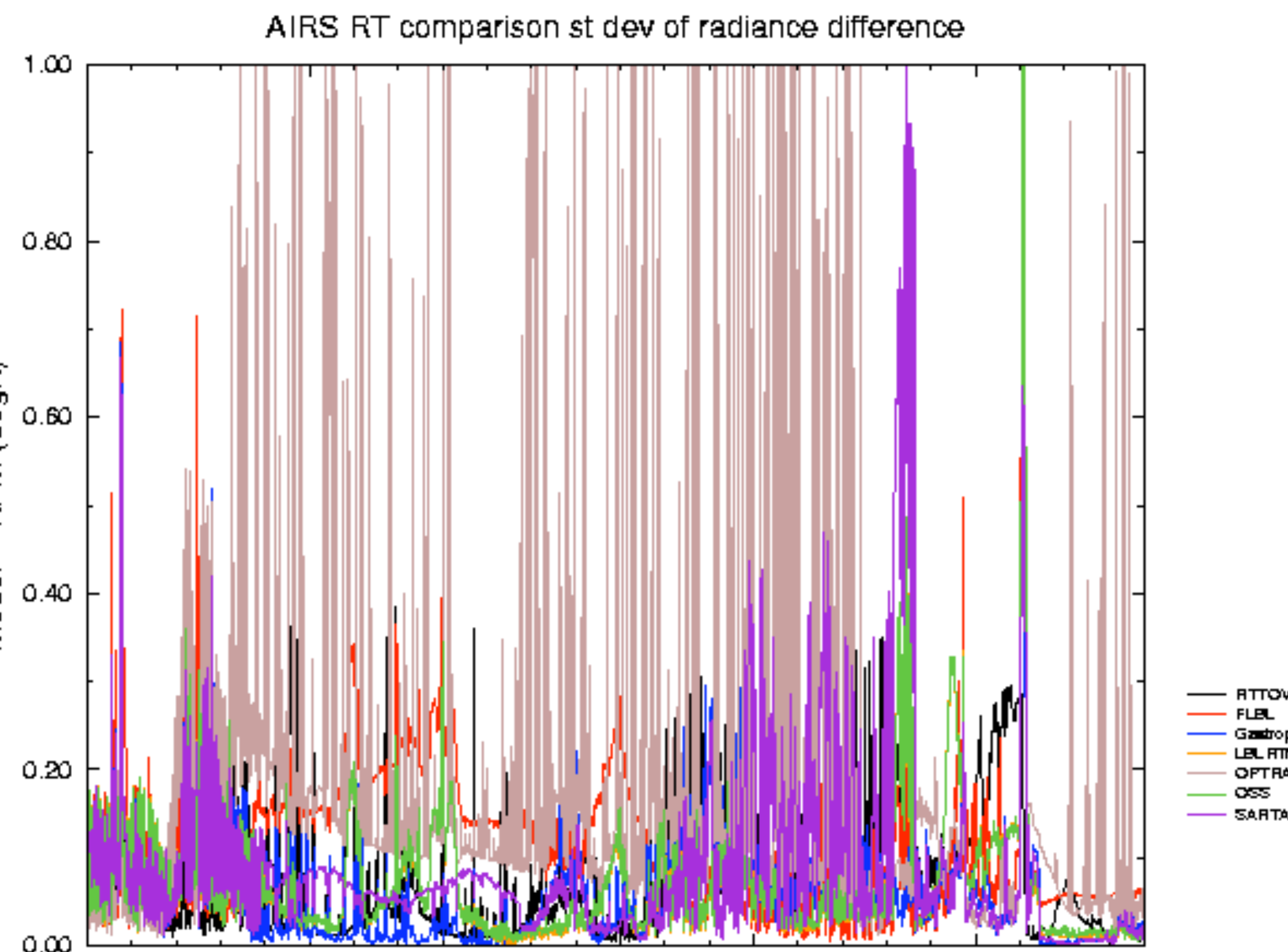
- To date have only compared direct calcs fo 8 models who have submitted results
- Used RFM (based on GENLN2) as reference model (this favours models base on GENLN2)
- Bias and sdev plots shown of differences for each AIRS channel for 51 diverse profiles


AIRS RT comparison mean profile
285
284.5
284
283.5
283
282.5
Br. Temp (degK)
RFM
RTTOV-7
FLBL
Gastropod
LBLRTM
OPTRAN
OSS
SARTA
Obvious differences

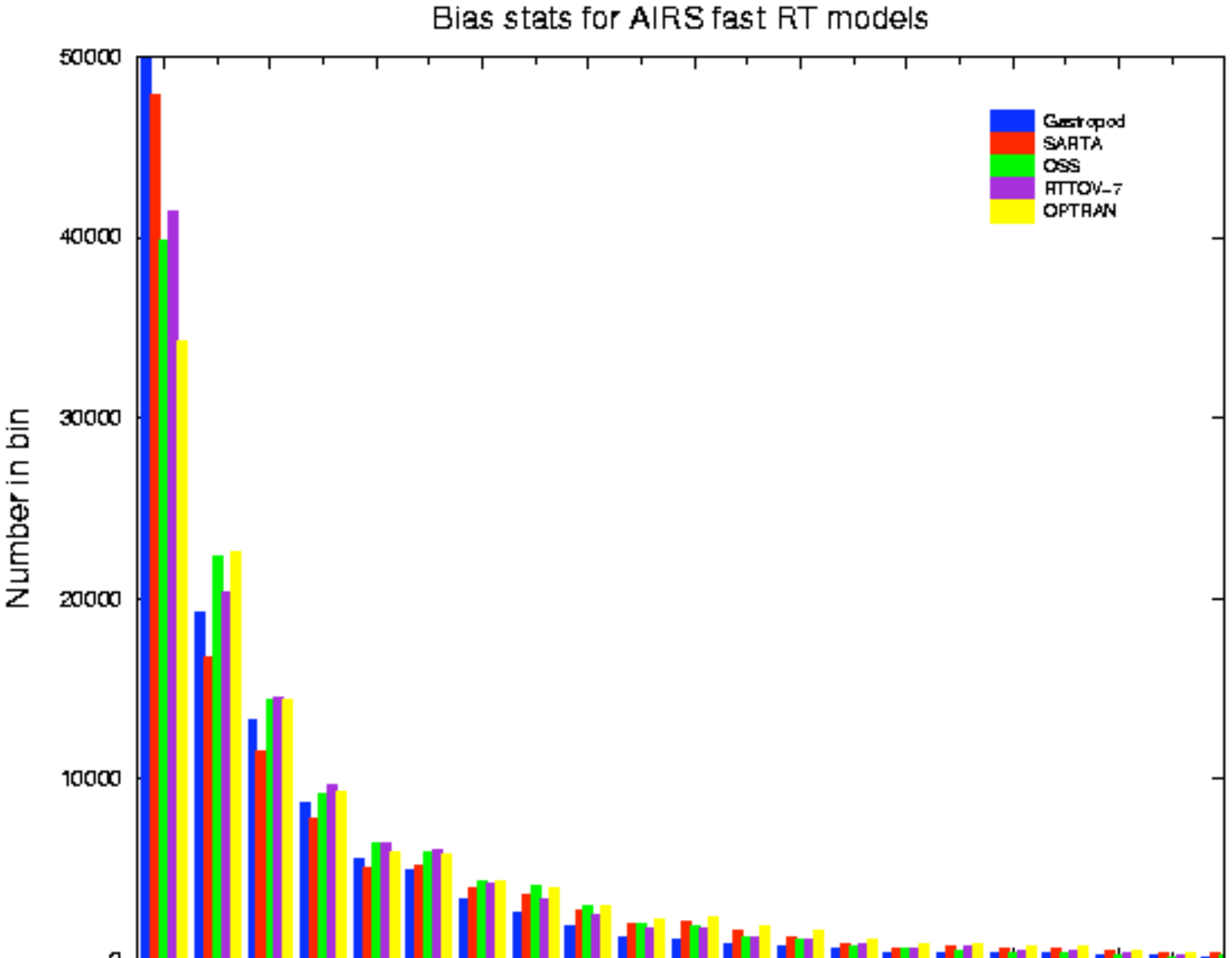
Model – RFM mean difference



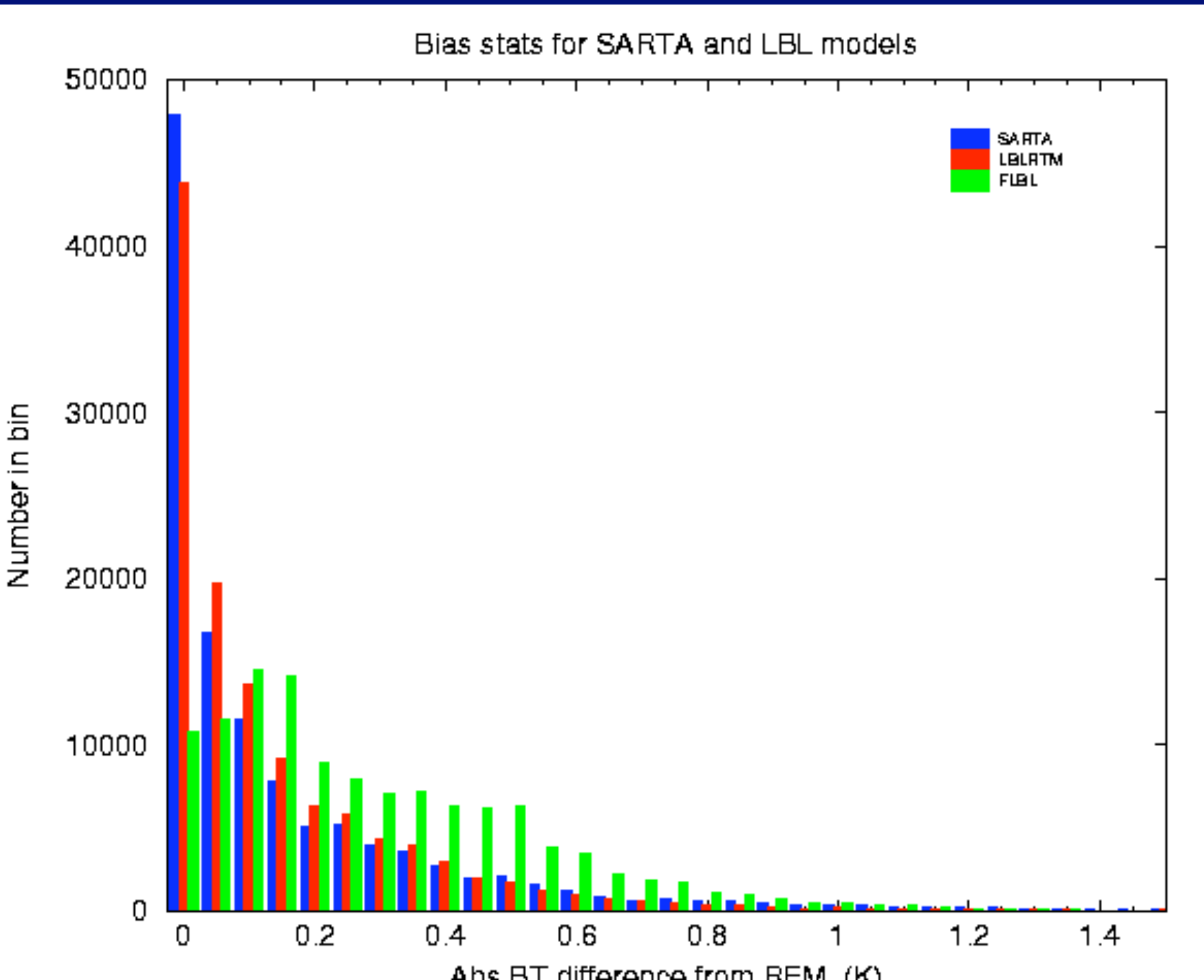
Model - RTM stdev of difference



models


Bias stats for AIRS fast RT models
Number in bin
50000
40000
30000
20000
10000
Gastropod
SARTA
OSS
RTTOV-7
OPTRAN

model


Bias stats for SARTA and LBL models
SARTA
LBLRTM
FLBL
Number in bin
50000
40000
30000
20000
10000
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Abs BT difference from BEM (K)

Summary

Good early response of participants

Some differences match those of LIE study

Different models have differences ~0.1K in most spectral regions

In a few spectral regions differences are up to 0.3 for some models

Against RFM all fast models show a reasonable performance *even though not based on RFM*

No work done on Jacobian results yet

Plan is to report full results in Spring 2004